

the parts from the different departments; and there is no need of waiting for the completion of one part into which another is required to fit, before making this latter part. This gain in time means a great deal in manufacturing, and was entirely impossible under the old-time system of machine building, when each part had to be made in the order in which it went to the finished machine, and each consecutive part had to be lined up with each one of the previously made and assembled details. Brackets, bearings, etc., had to be drilled in place, often with ratchet drills, which is a slow and always inconvenient operation.

Difference between Jigs and Fixtures. — To exactly define the word "jig," as considered apart from the word "fixture," is difficult, as the difference between a jig and a fixture is oftentimes not very easy to decide. The word jig is frequently, although incorrectly, applied to any kind of a work-holding appliance used in the building of machinery, the same as, in some shops, the word fixture is applied to all kinds of special tools. As a general rule, however, a jig is a special tool, which, while it holds the work, or is held onto the work, also contains guides for the respective tools to be used; whereas a fixture is only holding the work while the cutting tools are performing the operation on the piece, without containing any special arrangements for guiding these tools. The fixture, therefore, must, itself, be securely held or fixed to the machine on which the operation is performed; hence the name. A fixture, however, may sometimes be provided with a number of gages and stops, although it does not contain any special devices for the guiding of the tools.

The definition given, in a general way, would therefore classify jigs as special tools used particularly in drilling and boring operations, while fixtures, in particular, would be those special tools used on milling machines, and, in some cases, on planers, shapers, and slotting machines. Special tools used on the lathe may be either of the nature of jigs or fixtures, and sometimes the special tool is actually a combination of both, in which case the term drilling fixture, boring fixture, etc., is suitable.

Fundamental Principles of Jig Design. — Before entering upon a discussion of the minor details of the design of jigs and